also some extra measures to realize the anti-counterfeit purpose, such as the magnetic tape on the checkbook, the laser holograph on the credit card, and special marks which can only be seen under light with certain wavelength (U.S. Pat. No. 5,599,578). There are also methods using markers encapsulated in microspheres (U.S. Pat. No. 6,030,657), utilizing a person's fingerprints (U.S. Pat. No. 5,360,628), adding antigen to the object for detecting with antibody (U.S. Pat. No. 5,429,952, U.S. Pat. No. 5,942,444). Methods mentioned above are all meant to establish a technical or methodic barrier to prevent imitations and counterfeits. However, these known methods provide the protection of technical barrier which can be easily duplicated by persons with the same technical skills. This invention is meant to provide a more specific anti-counterfeiting method which can not be easily duplicated by people equipped with the same technical skills.

Page 2, lines 16-21, amend the paragraph as:

This invention utilizes the uniqueness of nucleic acid sequences. After mixing nucleic acid with media, the media can be tagged onto or infiltrated into the authentic objects for anti-counterfeiting purpose. The authenticity of the objects can be verified by examining the existence and composition nucleic acid.

Page 2, line 22 to page 3, line 20, amend the paragraph as:

A medium needs to have the characteristics of being fully miscible with nucleic acid, and is not part of the objects being tagged. The composition of nucleic acid was designed to have specific length and sequence which can only be verified with certain PCR (polymerase chain reaction) primers. For tagging process, the medium is first

liquefied in a solvent, and quantified amount of known sequence nucleic acid is added to the medium and mixed well. The medium nucleic acid is to be used to spread or fill objects. The medium solidifies after the evaporation of the solvent. For authenticity check, a small part of the medium is taken from the object and dissolved in a solvent; a solvent with high nucleic acid solubility is then added to extract nucleic acid. Centrifugation is used to separate the solvent with high nucleic concentration which can be used to perform PCR amplification procedure to examine the authenticity of the nucleic acid. Through this procedure, if the examined object carries the original nucleic acid, the PCR procedure will amplify extracted nucleic acid several million times with the same size and sequence of the original nucleic acid. On the other hand, if the examined object does not have the original nucleic acid, there will be no amplified nucleic acid product. Therefore, by comparing the size and amount of PCR products, the authenticity of labeled objects can be verified.

Page 3, line 21 to page 4, line 2, amend the paragraph as:

Since nucleic acid has sequence specificity, when performing PCR procedures only PCR primers with correct sequences can produce the original nucleic acid. In addition, the concentration of nucleic acid in the medium is very low which is extremely difficult to be decoded through cloning and transgenic methods, therefore warrants a very high security and specificity for anti-counterfeiting purposes.

Page 4, lines 15-21, amend the paragraph as:

This invention utilizes the characteristics of nucleic acid which allow replication

only when the sequences of two terminal ends are known. The invention is to preserve nucleic acid in a medium and then label objects with the medium. If the authenticity of the object is to be examined later on, it merely needs to examine the composition of the nucleic acid in the medium for authenticity check.

Page 4, line 22 to page 5, line 6, amend the paragraph as:

Nucleic acid is the general term for ribonucleic acid (RNA) and deoxyribonucleic acid (DNA). It can come from animal, plant, bacteria, fungus, virus et al., the so called organic organisms. But it can also be synthesized to form a vector or fragments. A unique characteristic of nucleic acid is that its specific sequence can be amplified with primers of specific sequences by PCR method. However, for PCR to work the prerequisite is that the terminal sequences of the nucleic acid fragment to be amplified is known in order to design primers with specific sequences for proper amplification.

Page 5, lines 7-12, amend the paragraph as:

The so-called medium is the intermediate used to encase nucleic acid and to attach to or mixed with objects. A good medium shall be able to mix well with nucleic acid, and can protect nucleic acid from deterioration. A medium also needs to be moldable and has proper strength and can be attached to objects being labeled.

Page 7, after line 25, add the following new paragraph:

In summary, the present invention presents a new method to dissolve nucleic acid completely in a water-insoluble medium. As described in the above two examples, polycarbonate/chloroform which is water-insoluble is used as the medium. A solution

mixture is first formed by the medium. Nucleic acid is dissolved in ethanol and acetone to form another solution mixture. The two mixtures are then mixed together for labeling. Because the medium is water-insoluble, it would not be easily erased. Therefore, the labeling for authentication could last for a long period of time.

ABSTRACT:

This invention features a method of labeling objects for anti-counterfeit purpose, especially refers to a method employing nucleic acid for product anti-counterfeit labeling and authenticity verification by PCR (polymerase chain reaction) method. The procedure involves labeling objects with medium which contains nucleic acid. For verification of authenticity, the medium is removed and extracted for nucleic acid which is then amplified by PCR method for comparison.

CLAIMS:

Cancel claims 1-15, and add new claims 16-39 as follows:

16. (New) A method of labeling a solid article or substance, comprising the steps of:

dissolving a water-insoluble medium in a first solvent to form a first mixture;

dissolving nucleic acid in a second solvent to form a second mixture;

mixing said second mixture with said first mixture to form a third mixture containing said nucleic acid;

labeling said article or substance with said third mixture; and

drying said labeled article or substance;

wherein said water-insoluble medium is an inert medium which is not deteriorative to